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|---|---|
| AFTERGUT, JEFF H | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1733 | |

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

C

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/646,509 | JOHNSON ET AL. | |
| | Examiner | Art Unit | |
| | Jeff H. Aftergut | 1733 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *03 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

***Claim Rejections - 35 USC § 103***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over PCT WO 03/035380 in view Koury and either one of Bendarzewski, et al or Zsolnay et al (newly cited) further taken with the admitted prior art and E.P. 198,744 optionally further taken with Ermert.

PCT '380 suggested that it was known at the time the invention was made to provide a system for application of composite material on a mandrel surface of a tool having a rotational axis. The reference suggested that a tool 3 having a mandrel surface was provided with a mechanical support structure wherein the tool surface was capable of rotation with a positioner 23 which rotated the same about the axis of the tool 3. the reference taught that a plurality of robots 20 were disposed on a support structure 24 and disposed about the tooling 3 wherein the robots 20 were responsible for application of resin impregnated fibrous material onto the mandrel surface of the tool 3. the reference taught that each of the plurality of delivery heads of the robots was individually adjustable relative to one another of the plurality of placement heads and relative to the mandrel surface during the automated composite lamination operation. PCT '380 additionally suggested that the mandrel surface of the tool 3 was irregular and thus one viewing the reference would have understood that each robot would have had to have been independently operated from the other robots in order to provide for proper placement of the composite material on the mandrel surface. The reference

suggested that the support 24 for the robots 20 carrying the placement heads 21 was in the form of a ring. The reference suggested that one skilled in the art would have employed plural robotic placement devices with associated applicator heads for placement of the fiber upon the form simultaneously. The applicant is advised that one viewing the reference would have understood the merits of utilizing plural applicators simultaneously for application of the material upon the mandrel. This is further exemplified by Koury and either one of Bendarzewski, et al or Zsolnay et al.

Koury suggested a plurality of placement devices which applied fibers in a tooling in the manufacture of an isogrid and expressly stated that the use of multiple heads increased the productivity of the operation. while the plural applicators were used to apply the material on a uniform tooling wherein the individual heads in Koury were not described as being capable of movement independently of one another, the reference to PCT '380 clearly envisioned the use of plural applicators which were capable of movement independent of one another. It should be noted that the heads in Koury were all disposed upon a ring which was arranged in a manner similar to that of PCT '380. Additionally, it should be noted that PCT '380 suggested that one skilled in the art would have disposed the mandrel in a vertical position as claimed . Additionally, the references of Bendarzewski, et al (column 7, lines 45-50) or Zsolnay et al (column 7, lines 45-50) both suggested that increased productivity would have been obtained with the use of plural applicator heads in a fiber placement system. It should be noted that the surface employed in either one of Bendarzewski, et al or Zsolnay et al was an irregular surface and thus one skilled in the art would have understood that each of the

applicators would have been operated independently of the other applicators when using plural applicator heads for application of the fiber material on the irregular form. The combination failed to expressly disclose the specific use of either tape application or fiber placement or contoured fiber tapes on the surface.

The admitted prior art suggested that it was known to apply fiber reinforcement with a tape laying head or a fiber placement head (which would have been able to apply the filaments along a contoured surface). These placement devices for fiber placement were known per se in the art of composite article manufacture. It should additionally be noted that the known flat tape application heads were known to have been useful for application of tapes having a width of 12 inches. Thus, one viewing the admitted prior art would have readily appreciated that the use of a flat tape fiber placement device (flat tape laying machine) would have been an alternative laying head to a contoured tape laying machine or fiber placement apparatus wherein the flat tape laying machines were clearly capable of accepting a 12 inch wide tape for application onto the form. While the reference to Koury or PCT '380 suggested that one skilled in the art would have utilized fiber placement devices, one skilled in the art would have been well aware that various devices were known in the art for application of filamentary material including both tape placement was well as fiber placement devices. To employ either device in the operation of PCT '380 would have been within the purview of the ordinary artisan applying fibers to a form for application thereto. The references to PCT '380 taught that the application device (whether it be fiber placement or tape laying) would have incorporated an arm as a manipulator for the application head as depicted in the

Figures therein for the robots. The reference did not dive specifics on the manipulation of the applicator heads with the robots which included the arms therein. The reference to European Patent 198,744 suggested such an arrangement.

More specifically, European Patent 198,744 suggested that it was known to associate an arm with a fiber placement of tape laying head in order to provide for the various degrees of freedom of movement of the head. The reference to E.P. '744 suggested that one skilled in the art would have utilized an arm with a placement head 5 including a roller for application of filamentary material from either a creel arrangement 8 or a tape from a spool supply 8a. clearly E.P. '744 envisioned that one skilled in the art would have understood that an applicator for a fiber placement device would have been disposed on the end of a manipulator which included an arm for multi axial movement. Note that the arm assembly provided for movement of the placement head in the exact local where one desired to disposed the fiber material. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ an arm as a means for placement of an applicator head of a fiber placement device as such arms were well known and useful for such manipulation as evidenced by either one of European Patent 198,744 wherein the placement devices would have included tape layers as well as fiber placement devices as such devices were well known for application of composite materials onto forms as expressed by applicant's admitted prior art wherein the tape placement heads included the capability of application of tapes having a width of 12 inches wherein the device for application of the material included a plurality of applicators disposed about a form including a ring which was

traversed about a rotating form as evidenced by Koury where the use of plural applicators was known as desirable as evidenced by either one of Bendarzewski, et al or Zsolnay et al in the system of application of composite material on a mandrel as taught by PCT WO 03/035380. It should be noted that the mandrel is not recited as part of the claims as presented herein (i.e. the diameter of a mandrel being 14 feet or more is not required of the system claims as presented but rather the apparatus merely must be capable of acting upon such a mandrel). Applicant is advised that one skilled in the art would have understood how to employ the specified

With regard to the various dependent claims, the use of a fiber placement device or a tape laying device for application of the composite material was well known as evidenced by the applicant's admitted prior art. The use of an arm to manipulate the applicator would have been within the purview of the ordinary artisan wherein such would have included the use of a controller wherein the arm provided for multiaxial movement of the placement device (such was known in the art at the time the invention was made and the reference to PCT '380 clearly provided control for placement of the material by controlling the applicator devices). It additionally should be noted that the rate of application was directly a result of the number of applicators as well as the speed with which the applicators were capable of applying the material. As the reference to Koury as well as either one of Bendarzewski, et al or Zsolnay et al clearly wanted to increase productivity with an increase in the number of applicators, it would have been within the purview of the ordinary artisan to provide for the specified production rates by

adding the required number of applicator heads and operating the device at a useful speed.

While the references to either one of European Patent 198,744 or PCT WO 03/035380 suggested that the use of an arm as a manipulator was well known for a fiber placement device, they do not afford one with the ability to interchange the heads to that the tool at the end of the arm could be altered to provide various applications (i.e. fiber placement of tape laying). However, the use of a robotic arm with an end effecter which was capable of being changed such that one could employ an arm with either a fiber placement device of a tape laying device as taught by Ermert. More specifically, the tool used at the end of the arm was capable of being changed in order to utilize the same robotic arm for various manipulative steps with differing tools. The reference suggested that the arm was capable of multiaxial movement. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ an arm with the fiber placement device in order to allow one to easily vary the tool disposed on the end of the arm as suggested by Ermert in the process and device of placement of fibers upon a form wherein an arm was used as the manipulator as taught by PCT WO 03/035380 and wherein it was known to utilize various placement devices including fiber placement and tape laying devices as taught by the applicant's admitted prior art when plural applicators were disposed on an application ring which was moved relative to the rotating form as taught by Koury as it was well known such plural applicators would have increased productivity as evidenced by either one of Bendarzewski, et al or Zsolnay et al in the system of applying plural fibers from plural

applicator heads simultaneously wherein eh heads were operable individually as suggested by PCT WO 03/035380.

3. Claims 1-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 2 further taken with Ninet et al.

While the references as set forth above suggested that one skilled in the art would have acted upon a mandrel wherein one applied composite tape to the same with multiple applicators which were separately controlled simultaneously, the references did not expressly state that one skilled in the art would have employed a mandrel of 14 feet in diameter or larger. It should be noted that the device as claimed is certainly capable of acting and applying the material upon a mandrel having a diameter of this size. Note that the references do not expressly recite what the diameter of the mandrel is in the operation, however for the apparatus claims the mandrel is not part of the apparatus. Additionally it should be noted that the speed of application is a process limitation which bears little weight in the apparatus claim (other than the apparatus must be capable of high rate of application of material).

Ninet suggested that those skilled in the art would have understood that it was not only possible to apply composite material upon a mandrel having a diameter of 14 meters but also that it was desirable. Ninet suggested that the mandrel diameter would have been 5-6 meters in diameter (which is 16.4-19.7 feet in diameter). It would have been understood that when making a large vessel or tank one skilled in the art would have employed a mandrel having the specified diameter. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ a mandrel

having a diameter greater than 14 feet when making a composite vessel which was of a large size as evidenced by Ninet et al in the process of making a composite vessel wherein a plurality of applicator heads were used simultaneously to apply material upon the mandrel simultaneously in order to increase the rate of productivity as evidenced by the references as set forth above in paragraph 2.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In each of the independent claims (claims 1, 11, and 19), the applicant has recited that the mandrel has a "thickness of at least 14 (or 15) feet", however the thickness of the mandrel is NOT what applicant is claiming but rather it is the diameter of the mandrel which applicant is reciting. It is not clear what is meant by "thickness" of the mandrel as the mandrel clearly did not have a thickness of 14 or 15 feet but rather it had a diameter of 14 or 15 feet. In each instance it is suggested that "thickness" be changed to --diameter--.

***Response to Arguments***

6. Applicant's arguments with respect to claims 1-37 have been considered but are moot in view of the new ground(s) of rejection.

The applicant argues the invention as if all of the claims are directed to a method rather than both method and apparatus claims. It should be noted that claims 1-30 relate to an apparatus and additionally that in these claims the apparatus did not include a mandrel therein. As such, the apparatus merely need be capable of application of material upon a mandrel of a diameter of 14 or 15 feet or more. As noted above the references are believed to teach a device which is fully capable of the same. In any event, it should be noted that the reference to Ninet et al clearly taught that one skilled in the art would have known to employ a mandrel having a diameter greater than 14 or 15 feet in the manufacture of a composite part. Clearly, dependent upon the size of the vessel needed, one skilled in the art would have understood to utilize a mandrel having the specific size as recited.

It should be noted regarding the inclusion of the width of the tape being applied that the reference to the admitted prior art expressly stated that for tape laying it was known per se to apply a tape with a width of 12 inches in the application head.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff H. Aftergut whose telephone number is 571-272-1212. The examiner can normally be reached on Monday-Friday 7:15-345 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 571-272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jeff H. Aftergut
Primary Examiner
Art Unit 1733

JHA
November 1, 2006